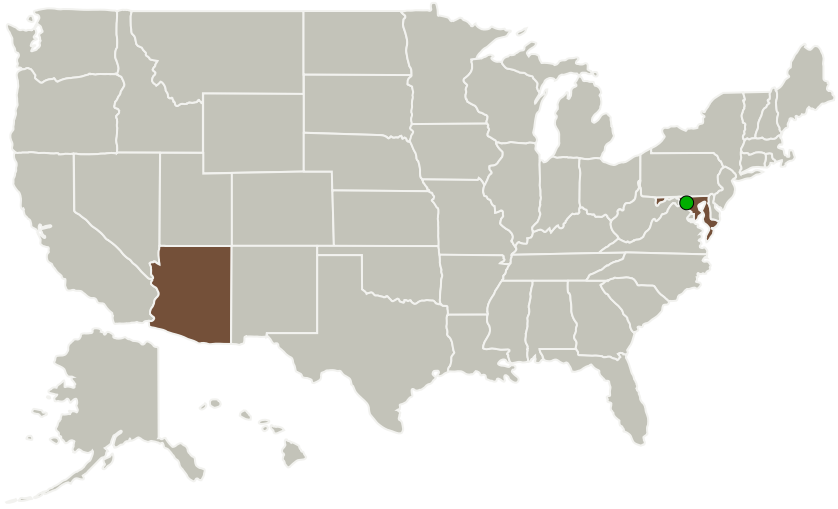
Compact High Pulse Energy Single Frequency Fiber Amplifier, Phase I

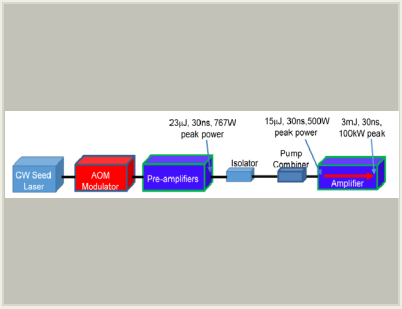
Completed Technology Project (2016 - 2016)

Project Introduction

Atmospheric methane is the second most important anthropogenic greenhouse gas. The overtone lines of methane at 1.65 micron are well suited for remote sensing of atmospheric methane in the Earth's atmosphere. NASA have already demonstrated ground-based and airborne methane detection using Optical Parametric Amplifiers at 1651 nm using a laser with a narrow linewidth. In this setup a single frequency pulsed laser near 1 micron wavelength with several mJ pulse energy is needed. We propose to develop a compact pulsed single frequency fiber laser with greater than 3mJ pulse energy and 30ns pulse width using our innovative Yb-doping fiber. Highly efficient Yb doped glasses will be developed, double cladding fibers will be designed and fabricated, the amplifier performance will be characterized. In Phase II we will build a deliverable prototype high energy and high peak power fiber laser system for NASA.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
AdValue Photonics, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Tucson, Arizona
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Arizona	Maryland

Project Transitions

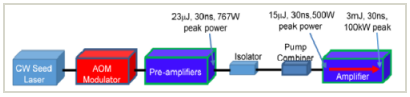
June 2016: Project Start

December 2016: Closed out

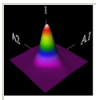
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139722)*

Images



Briefing Chart Image
Compact High Pulse Energy Single Frequency Fiber Amplifier, Phase I *(https://techport.nasa.gov/image/136081)*



Final Summary Chart Image
Compact High Pulse Energy Single Frequency Fiber Amplifier, Phase I Project Image *(https://techport.nasa.gov/image/129723)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
AdValue Photonics, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

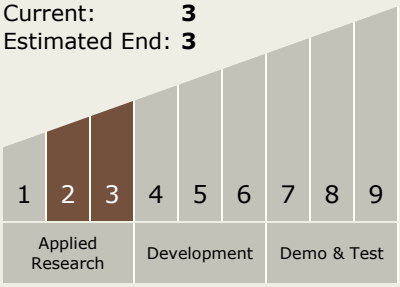
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Shibin S Jiang

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System